CITY OF LOUISVILLE, COLORADO

DROUGHT MANAGEMENT PLAN

PREPARED BY:
CITY OF LOUISVILLE
PUBLIC WORKS DEPARTMENT

ADOPTED MARCH 2004

CITY OF LOUISVILLE
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City of Louisville Drought Management Plan

INTRODUCTION

This drought management plan is a guide for the City of Louisville for the varying degrees of drought experienced in the normal variations of weather patterns. The purpose of this document is to identify the conditions, which formally place the City in a designated level of drought and predetermine the general responses appropriate for given drought conditions. It also establishes the general framework for when drought conditions require special communications with residents and the type of information anticipated to be communicated.

DEFINING A DROUGHT

Defining a drought is somewhat difficult given the degrees to which droughts occur. In general, a drought is an event of unknown duration whereby available water is significantly less than a community is normally accustomed to. Droughts can be defined two ways, 1) the duration in which normal water supplies to do not materialize, and 2) the extent or amount of deficiency in normal precipitation from a historic average.

Colorado has historically seen cycles of above and below average precipitation. Even though these variations are part of the natural weather cycle they still present a risk to our quality of life. The impact of a drought can be social, environmental, and economic. However, a drought's impact can be mitigated through good planning and preparedness.

LOUISVILLE'S WATER SUPPLY SYSTEM

The City of Louisville was founded in 1878. For a number of years the community's water system was based solely on Louisville Reservoir, which was constructed in the late 1890's. During the 1950's drought, the community realized this facility could not handle resident needs for water during dryer weather cycles. Therefore, in the mid 1950's the City constructed a steel pipeline to divert water from South Boulder Creek at Eldorado Springs to Louisville Reservoir. In addition, the City embarked on a program of acquiring additional summer water rights to supplement its water supply. As the community grew, additional efforts were taken to enhance the reliability and quantity of water available to Louisville. These efforts included obtaining a contract right to store water in Marshall Lake, a major reservoir in the Louisville area and constructing Harper Lake Reservoir in 1985. In the 1990's, after a number of years of significant growth, the City realized the community's water supply could not be reliably obtained solely from South Boulder Creek and Marshall Lake. Therefore, the City of Louisville joined the Northern Colorado Water Conservancy District allowing access to Colorado Big Thompson (C-BT) and Windy Gap water resources. Since that time Northern Colorado Water Conservancy District (NCWCD) has been the primary focus of the City's ongoing efforts to provide a reliable water supply.

WATER AND WEATHER

In Colorado, weather plays a significant role in determining the amount of water available. It is relatively easy to project water needed for a given development or recreational facility. It is much more difficult to integrate the effect of variations in weather on the total amount of water available to Louisville. Approximately half the water used in Louisville is for landscape irrigation. The other half is used for domestic, industrial, and commercial purposes.

HOW RELIABLE SHOULD A WATER SUPPLY BE?

When the City adopted its Raw Water Master Plan it selected a drought event of 24 months with a 50-year reoccurrence interval as the drought event that our water system should be designed to withstand. The current drought event, which has seen a number of years of below average water supply, is more severe than the design drought to which our water supply is to be measured. In fact, the 2002 drought has been considered to be a 1 in a 300-year drought event within the local water supply basin. This means the events of 2002 were well outside any reliability criteria established for Louisville's water supply system. In spite of this the City was able to supply essential health and safety water and still maintain landscape materials within the community.

DROUGHT RESPONSE PLAN

Once it has been determined Louisville is facing a drought event, the City should be prepared to implement an appropriate predefined drought response plan. However, determining when a drought has begun can only be done in hindsight and determining when a drought will end is only possible if one can predict the future. Using historical information regarding drought events, stream run-off, and related factors is the only way to prepare appropriate projections to be incorporated into an overall drought response plan.

DROUGHT INDICATORS

It should be kept in mind that a drought will likely begin with a small event and become more severe. Droughts may last a month or several years. With this plan, the City should be able to move through the drought severity ratings as a drought continues. When projecting water supply for Louisville, one typically looks at the critical period of March, April and May. Historically this is the time when the reservoirs approach their lowest level while at the same time snow pack measurements provide reasonable projections for runoff for the coming season. The amount of water in storage and the projected amount of available runoff determines the City's ability to meet water demands.

At best, drought indicators are only a guideline. It takes detailed analysis and extensive experience to understand within a given set of circumstances the amount of water likely to be available to the community. In many cases, the same amount of snow pack can have significantly different runoff patterns resulting in large variations in the amount of useable water.

Numerical indicators alone, such as the amount of water currently in storage, are not always accurate indicators of a drought event. When used in conjunction with more predictive

indicators, such as projections for the amount of water becoming available from runoff, numeric indicators are more realistic. Confidence in the projections of the water supply will vary throughout the year, with the projections being most reliable during the late spring when quotas are set and the runoff is more predictable, to the least reliable in November when only the amount of water in storage is known. Therefore, it is recommended that the City establish a predictive tool incorporating both numerical and predictive indicators to indicate when the City's water supply may not meet the demand.

A Water Supply Index (WSI) is proposed based on the existing storage and projected supplies and demands for the City. The basic form of the WSI would be as follows:

$$WSI = \frac{Supply}{Demand} = \frac{Carryover_{(last)} + SBCdirects + NCWCD + Marshall}{Demand + (Targeted\ Carryover - Carryover_{(next)})}$$

Supply incorporates the amount of water carried over from the previous year (carryover last), plus the projected amounts of water to be obtained from (1) the City's direct flow rights on South Boulder Creek, (SBC Direct), (2) Northern Colorado Water Conservation District allocations from C-BT and Windy Gap (NCWCD), and (3) share yield of Farmers Irrigation and Reservoir Company interest held in Marshall Lake. Demand is the projected water use by the City under 'normal' conditions plus the amount of carryover water determined necessary to reasonably buffer the City from future events less carryover water in storage.

The WSI equation results in a index that will indicate the expected amount of water available to meet current demands. A WSI of one (1.0) would mean that the supply would meet the demand, including designated reserves. A value greater than or less than one would mean that there is either an excess or a shortage of water, respectively.

The WSI can be used to indicate the potential severity of a water shortage and how the City should respond. A WSI in the range of 0.95 to 0.85 would trigger a Stage 1 response. The trigger for a Stage 2 response would be a WSI between 0.85 and 0.75. A WSI between 0.75 and 0.65 would indicate a Stage 3 drought and a WSI less than 0.65 would trigger a Stage 4 response. Other factors may influence the level of response and vary from the response dictated by the WSI.

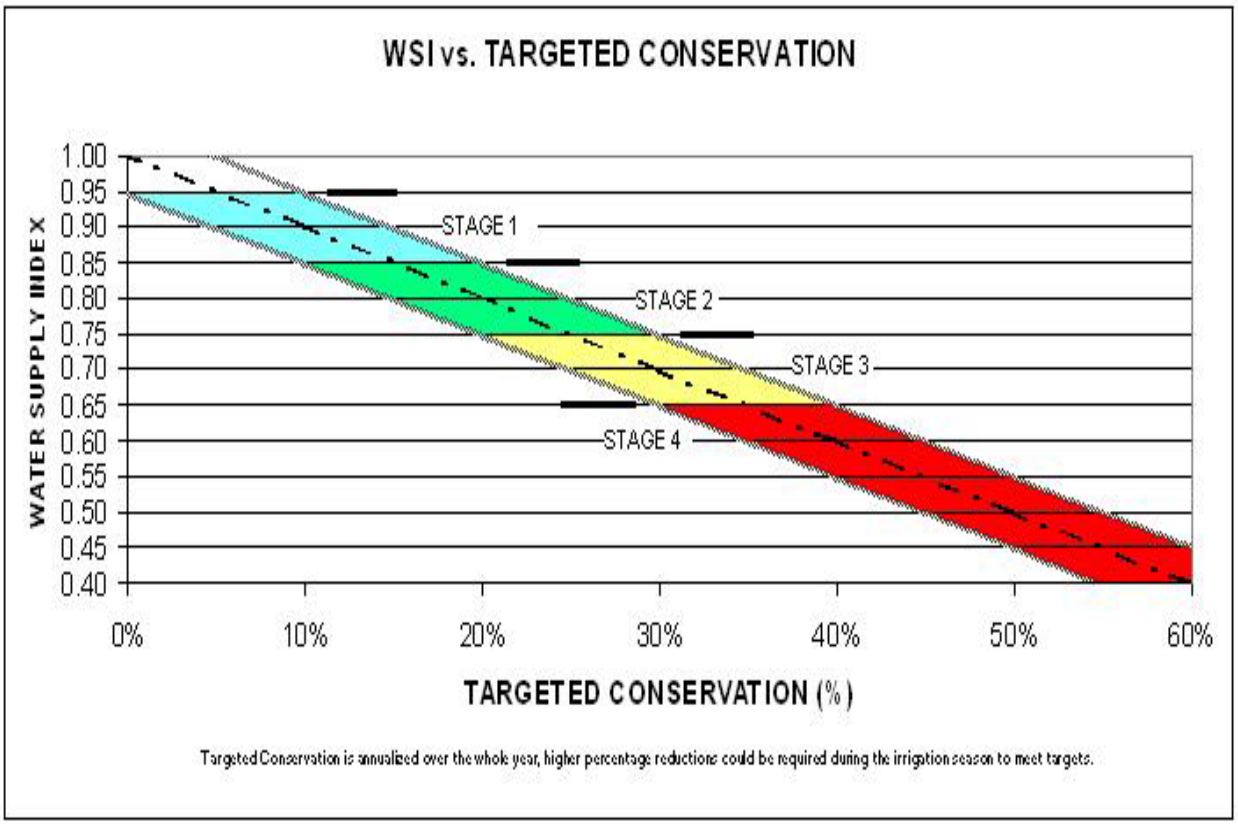
Projected inflows are based on historic relationships between snow pack and stream runoff. If this calculation indicates water supply for a drought stage is less than required, the City would enter the next level of drought response. The following guidelines will be utilized to indicate the drought event under existing conditions. The guidelines will be adjusted as demand increases and additional water resources are acquired.

Stage 1 - Projected stream flow and reservoir yields are less than 95 percent of normal demand. South Boulder Creek direct flow diversions projected between 2300-2700 AF, CBT yield of approximately .45 AF, Windy Gap yield of approximately .15 AF and Marshall Lake yields between 2-2.5 AF per share. Carryover water from previous years yield is less than 800 AF. (WSI .95-.85)

Stage 2 - Projected stream flow and reservoir yields are less than 85 percent of normal demand. South Boulder Creek direct flows projected to be at 2150-2300 AF, approximate CBT yield at .4 AF per share, Windy Gap approximately .12 AF and Marshall Lake yields between 1.75 to 2.25 AF per share. Carryover water from previous years yield is less than 725 AF. (WSI .85-.75)

Stage 3 - Projected stream flow and reservoir yields are less than 70 percent of normal demand. South Boulder Creek direct flow diversions are projected to be between 1800-2180 AF, CBT at approximately .35 AF per share, Windy Gap approximate 0.10 AF and Marshall Lake yields less than 1.75 AF per share. Carryover water from previous years yield is less than 650 AF. (WSI .75-.65)

Stage 4 - Projected stream flow and reservoir yields are less than 50 percent of normal demand. South Boulder Creek direct flow diversions are projected at 1400-1800 AF, CBT at less than .3 AF per share and Marshall Lake yields less than 1.3 AF per share. Carryover water from previous years yield is less than 500 AF. (WSI .65 and less)



Drought Response Strategies

There are two primary approaches for responding to a drought. One is to increase water supply and he other is to reduce demand. Each option presents uniquely different opportunities and challenges to managing a water supply during a drought. For Louisville, the opportunity to increase supply has somewhat limited options. It is possible during a drought to lease surplus water from other communities or agricultural users to meet short-term deficiencies in supply. However, this option will be fairly expensive and may not materially improve water supply in a time of diminished yields. Given that the more extreme a drought, the greater the competition for the available water, it is unlikely options for additional supplies will result in significant changes to the City's water supply. Therefore, the focus of the Drought Management Plan is on how to reduce water usage consistent with the drought event being experienced. In order to quantify drought events a relationship between water reduction and the severity of the drought event has been developed. Each stage of a drought event is associated with a targeted reduction of water usage. The four drought event stages selected for the City's Drought Management Plan are identified in Table 1 – Drought Response Plan Summary.

Table 1: Drought Response Plan Summary

Drought Stage	Conservation Goal (annual reduction target)	Main Focus-Private Citizens & Businesses	Main Focus-City Agencies
Stage 1 **Moderate**	10%	Voluntary conservation measures.	Provide water wise information and education.
Stage II **Serious**	20%	Keep the following vegetation alive: - Trees - Shrubs - Vegetable Gardens - Flower Gardens - Lawns	Keep the following vegetation alive: - Trees - Shrubs - Flower Gardens - Turf *(Prioritize playing fields for use and watering, keep unused playing fields alive*) Open all public pools
Stage III **Severe**	30%	Keep the following vegetation alive: - Trees - Shrubs - Vegetable Gardens	Keep the following vegetation alive: - Trees - Shrubs - Turf (*playing fields and other where possible*) Determine on case-by-case basis if public pools will open.
Stage IV **Extreme**	50%	Sustain some mature trees, but recognize there may be a major die-off of lawns, trees, and shrubs.	Sustain some mature trees, but recognize there may be a major die-off of turf, trees, and shrubs.

DROUGHT WATER RATE SURCHARGE PLAN

The approach reflected in this Drought Management Plan is the cost of water should be established during the various drought events to generate reductions in water usage necessary to balance supply and demand. In other words, the City's water saving plans are rate based and are not dependent on an extensive list of do's and don'ts associated with water usage. Realistically, in more sever drought events it is likely citywide restrictions prohibiting wasteful water use practices (such as day time watering) will be implemented. The amount of water allocated per single-family equivalent tap is based on historical usage less the water savings needed to maintain adequate reserves. For example, in the case of a single-family residential account, average usage is approximately 5,600 gallons per month during the October through March time period. During the summer typical single-family usage averages approximately 13,000 gallons per month, with a peak average of 18,500 gallons in July. This plan is also based on the premise that more water can be saved during the summer months than the winter months given the winter months reflect a non-irrigation usage necessary for public health and safety. Historic consumption information is contained in the appendix. This information was used in identifying the rate surcharge needed in order to induce water conservation.

STAGE 1 – MODERATE

Rate Surcharge - None

STAGE 2 – SERIOUS

Rate Surcharge – Each single-family account will be allocated 5,000 gallons per month usage at the base rate (currently at $1.70 per thousand gallons). Water consumed beyond the 5,000 gallons will be billed per Table 2 – Surcharge Rates.

STAGE 3 – SEVERE

Rate Surcharge – Each single-family account will be allocated 5,000 gallons per month indoor usage at the base rate (currently at $1.70 per thousand gallons). Water consumed beyond the 5,000 gallons per month will be billed per Table 2 – Surcharge Rates.

STAGE 4 – EXTREME

Rate Surcharge – Each single-family account will be allocated 5,000 gallons per month usage at base rate (currently at $1.70 per thousand gallons). Water consumed beyond 5,000 gallons per month will be billed per Table 2 – Surcharge Rates.

NON RESIDENTIAL ACCOUNTS

Multifamily, commercial, and industrial accounts will be allocated water based on their tap size. In Louisville tap size is proportional to tap fee, which means the larger the tap the more one pays for water resources. For example, a 2-inch water tap has approximately seven times the capacity of a standard ¾ inch single-family tap. The 2-inch tap account would be allocated seven times the amount of water resources for a given drought stage as a single-family account.

As an example a 1 ½-inch non-residential tap (4 SFE's) would be charged as follows:

STAGE I – MODERATE

Rate Surcharge - None

STAGE II – SERIOUS

Each 1½ -inch account will be allocated 20,000 gallons per month usage at base rate (currently at $2.50 per thousand gallons). Water consumed beyond 20,000 gallons per month will be billed as follows:

20,001 – 40,000 at 2 times the base rate
40,001 – 60,000 at 4 times the base rate
60,001 - 80,000 at 6 times the base rate
80,001 – 100,000 at 8 times the base rate
100,001 – 200,000 at 10 times the base rate
200,001 and over at 20 times the base rate

STAGE III – SEVERE

Each 1½ -inch account will be allocated 20,000 gallons per month usage at base rate (currently at $2.50per thousand gallons). Water consumed beyond 20,000 gallons per month will be billed as follows:

20,001 – 40,000 at 3 times the base rate
40,001 – 60,000 at 6 times the base rate
60,001 - 80,000 at 9 times the base rate
80,001 – 100,000 at 12 times the base rate
100,001 – 200,000 at 15 times the base rate
200,001 and over at 20 times the base rate

STAGE IV – EXTREME

Water consumed beyond 20,000 gallons per month will be billed as follows:

20,001 – 40,000 at 5 times the base rate
40,001 – 60,000 at 10 times the base rate
60,001 - 80,000 at 15 times the base rate
80,001 – 100,000 at 20 times the base rate
100,001 and over at 25 times the base rate

TABLE 2 – RESIDENTIAL SURCHARGE RATES

EXISTING RATES		STAGE 1 - MODERATE		STAGE 2 - SERIOUS		STAGE 3 - SEVERE		STAGE 4 - EXTREME	
Consumption	Rate*	Consumption	Surcharge	Consumption	Surcharge*	Consumption	Surcharge*	Consumption	Surcharge*
5,001-20,000	$2.50	5,001-20,000	None	5,001-12,000	2	5,001-10,000	2 ½	5,001-15,000	5
20,001-30,000	$6.00	20,001-30,000	None	12,001-20,000	5	10,001-20,000	6	15,001-20,000	10
30,001-40,000	$6.50	30,001-40,000	None	20,001-30,000	6	20,001-30,000	12	20,001 & over	20
40,001-50,000	$7.00	40,001-50,000	None	30,001 & over	8	30,001 & over	18	N/A	N/A
50,001 & over	$7.50	50,001 & over	None	N/A	N/A	N/A	N/A	N/A	N/A

*Surcharge is a multiple of the base rate, currently $1.70 per 1000 gallons of water used.

DROUGHT RESPONSE PLAN

In order for a drought response plan to be useful a number of components should be included in the plan. They are:

- **Public Participation**. A drought response plan should include public participation before, during, and after a drought. Public participation would include comments on the original drought management plan document. To gain public involvement, information should be disseminated to the public as to why the community is at a given drought level response. There should also be the ability for the public to comment during a drought so residents know their concerns and problems are being considered. Typical methods of receiving public comments should be public meetings, phone calls, emails, and other.

- **Acknowledgement of Public Versus Private Standards**. A drought response plan needs to provide utilization of a scarce resource in a manner benefiting the majority and may need to accommodate a different watering standard for public property versus private. Even priority of uses within public facilities will need to be established. This concept provides for a higher allowance of water usage for public property, which is shared by all. During the most severe drought this type of approach prioritizes which public property has the highest use value and serves the most residents.

- **Equity**. In order to be well accepted, a drought management plan should strive to insure that inconvenience, discomfort, and sacrifice is shared in an equal manner across all customers. It is important to acknowledge conservation may not be exactly equal by customer class but is done to reflect the values of the community by utilizing water in a way that is important to the total community. This equity concept would address the relative value of water used by individual residents for landscaping purposes compared to community facility uses such as golf courses, parks, and pools and similar facilities.

- **Flexibility**. Responding to a drought requires water use restrictions, but hopefully not to the point where individual customers can't decide how best to use their water. Frequently, water customers prefer to be told the quantity of water they can use in a given time period instead of the uses they are allowed to apply it to. This allows them to direct water to their highest priority uses. It is likely that in the most serious or extreme cases of drought flexibility will be reduced given the critical nature of the water supply. Enforcement actions, if needed, should be perceived as being applied equally to all customers. Excess enforcement may reduce public acceptance of the water use reduction necessary to meet stated objectives of the Drought Management Plan. Over zealous enforcement could result in counter productive results.

- **Visibility.** A drought management plan should be highly visible within the community. Aspects of a visible program would be feedback on how well conservation measures are working, frequent reports on whether water supplies are more or less plentiful than predicted, and sharing of the concerns or problems residents are experiencing as part of the plan.

DROUGHT RESPONSE PLAN STAGE DESCRIPTIONS

Stage 1 – Moderate

Use reduction target 0-10%.

A drought of this severity would primarily focus on voluntary programs to reduce water usage. At this level of drought it is not expected that noticeable impacts to landscaping would result from voluntary reductions in water usage. Steps taken to reduce water usage would include the following:

- Eliminate wasted water from sloppy irrigation practices, leakage, and other marginal or unnecessary outdoor water use.
- Discourage changes in landscaping to higher water use landscapes.
- Internally, City departments would establish and identify ways to reduce water usage by the amount identified.
- Reinforce incentives for converting plumbing fixtures and irrigated areas to low water usage and high efficient devices.
- Work with large water users to identify possible areas where their water usage could be reduced.

Stage 2 – Serious

Use reduction target of 20%

A drought of this severity would require more than eliminating waste and voluntary water saving activities. This form of drought would require moderate changes to normal water use habits such as limiting the duration for which irrigation systems are operated. Surcharges to emphasize the need for conservation will be utilized in a drought rate structure. Watering restrictions would be limited to time of day to avoid needless waste of water. There may be some stressing of turf but it would not be extensive in duration or result in permanent damage. Suggested water saving activities would include the following:

- Identify water reductions. Outdoor turf irrigation could be limited to specific hours of the day.
- Sidewalk, driveway washing or street cleaning through hosing, car washing by bucket only (no hoses), and other water intensive methods would be discouraged. Street sweeping, which utilizes nominal amounts of water for dust suppression would continue as normal.
- Postpone new landscaping associated with development and discourage landscape modifications that result in higher water usage.
- Implement the surcharge on water usage previously referenced for the purpose of encouraging water conservation and maintaining revenue for the water utility.

Stage 3 – Severe

Use reduction target 30%.

A drought of this severity and duration would effectively eliminate most outdoor water usage, except for targeted community uses. Most residential and commercial accounts would receive little irrigation water, and therefore see a totally dormant or die off of turf depending on the type. Tree, shrub, and garden watering would follow established guidelines. Water saving activities would be as follows:

- Restrict turf irrigation including parks, golf courses, and other public facilities unless irrigated with reuse water, and only to the extent that utilization of reuse water will not result in additional demand on raw water resources.
- Implement the drought surcharge in water rates to strongly encourage water conservation through pricing mechanisms and stabilize water revenue.
- Through city ordinance provide incentives for significant water users such as hotels, motels, etc. to install low flow plumbing fixtures and reward same with significant pricing incentives for water reduction.

Stage 4 – Extreme Drought

Targeted water savings 50%.

A drought of this severity and duration would require all outdoor water usage to be prohibited. The drought surcharge would be implemented to emphasize water saving needs through pricing mechanisms. A special water rate structure such as a water budget based rate structure could be implemented. Given the likely duration of this event, it is probable that all turf would be lost and there would be significant die off of trees, shrubs, and associated landscaping. Water saving activities would be as follows:

- Prohibit use of all outdoor watering.
- Close public swimming pools and other water using facilities such as the Recreation Center. Prohibit filling of private swimming pools, hot tubs, ornamental fountains and other optional water features.
- Implement a moratorium on new water taps until minimum reservoir levels are seen or drought is over.
- Establish a high profile indoor water conservation program for the purpose of eliminating waste through leak detection and incentives for converting plumbing fixtures to low water usage fixtures.

PUBLIC INFORMATION

During a drought it is important to convey information to the public regarding what is happening, why it is happening, and the impact to individuals. This communication component is critical regardless of the severity of the drought. A good communication effort can significantly improve public acceptance and therefore actual water savings targeted by a drought plan.

Regardless of the severity or duration of a drought, it will be necessary to communicate frequently with the public. However, it is likely that as the drought becomes longer in duration and more severe that communication frequency and the quantity of information disseminated will increase. The following activities are anticipated to be needed at increasing levels of effort during and as a drought increases in severity:

- Designate a spoke person or persons who will be the primary contact with media and the community.
- Implement internal communication protocol to ensure the information request and service request outside the established program are conveyed to the right staff members.
- Identify the frequency and type of information disseminated on a routine basis.
- Enhance the City's web page to provide real time and daily information regarding water usage and water savings.

STAFFING AND RESOURCES

As a drought develops it is likely that additional resources will be needed to implement the various components of a drought management plan. This will likely occur during times when revenue is declining because of an anticipated watering reduction. It is also expected that existing staff will be assigned temporary drought responsibilities in order for the various actions to be undertaken in a reasonable time frame. Temporary reassignment of staff or the procurement of additional staff resources to deal with the drought will be utilized in order to:

- Implement the desired communication and public relations program for given level of drought.
- Prioritize staff assignments to include assisting residents with private irrigation system leak detection, irrigation system operations, and other drought related activities.
- Developing "exception" criteria to deal with hardships and health and safety issues.

Additionally, a city drought management team would be established to address the following:

- Consistency and leadership role on city water usage.
- Coordination and consistency of information (i.e. Finance Department for utility billing, Land Management Department on park usage and impact, Public Works personnel at the water treatment plant and Administration).

TOTAL HISTORIC RAW WATER DEMAND at WATER TREATMENT PLANTS

Data Provided by Water Treatment Plant Staff

MONTH	WATER YEAR (Nov 1 - Oct 31) 1997	1998	1999	2000	2001	2002	2003	2004	AVERAGE w/2002	AVERAGE w/o 2002	MONTHLY MAXIMUM
	VALUES ARE IN (acre-feet)										
NOV		175	209	**247**	192	215	*153*	162	193	190	247
DEC		184	184	**205**	202	197	*169*	163	186	185	205
JAN	**223**	195	206	197	210	196	*172*	175	197	197	223
FEB	194	177	**198**	188	178	187	*154*		182	182	198
MAR	251	209	**253**	220	206	213	*153*		215	215	253
APR	233	206	242	326	247	**369**	*168*		256	237	369
MAY	460	489	400	**602**	443	453	*347*		456	457	602
JUN	500	605	640	**749**	716	*387*	478		582	615	749
JUL	**810**	764	799	792	776	*448*	701		727	774	810
AUG	458	623	579	**738**	721	*393*	627		591	624	738
SEP	468	**593**	482	554	575	*318*	408		485	513	593
OCT	331	336	267	308	**354**	*225*	345		310	324	354
TOTAL	3,927	4,556	4,461	5,126	4,821	3,599	3,876		4,381	4,512	5,341

NOTES:

Highlighted values are monthly maximums.

Monthly minimiums were seen when strict watering restrictions were in place during 2002-2003

Historic Raw water Demand is the total amount of water that entered either water treatment plant during the month.
The values do not reflect losses that accured in the Raw Water System upstream of the plants.

Average w/2002 includes all data. Average w/o 2002 is the average of all data excluding 2002 data.

WATER SUPPLY INDEX VARIABLE DETERMINATION WORKSHEET

VARIABLE REDUCTION REQUIRED TO PRODUCE A GIVEN WATER SUPPLY INDEX

EXISTING CONDITIONS

Demand (AF) 5000 Targeted Carryover (AF) 1250

			WSI VARIABLES										
	WATER SUPPLY INDEX (WSI)	VARIABLE REDUCTION (%)	SUPPLY (AF/yr)	SBC DIVERSIONS (AF)	C-BT based on QUOTA	1739 (AF)	WG based on QUOTA	900 (AF)	MARSHALL LAKE shares QUOTA	322.5 (AF)	CARRYOVER (last) (AF)	CARRYOVER (next) (AF)	TOTAL DEMAND (AF)
NORMAL	156%	0.00%	7,776	4,000	0.7	1,217	0.2	180	3.5	1,129	1,250	0	5000
STAGE 1	90%	36.50%	4,938	2,540	0.44	773	0.13	114	2.22	717	794	456	5,456
STAGE 2	80%	43.00%	4,432	2,280	0.40	694	0.11	103	2.00	643	713	538	5,538
STAGE 3	70%	49.50%	3,927	2,020	0.35	615	0.10	91	1.77	570	631	619	5,619
STAGE 4	50%	63.00%	2,877	1,480	0.26	450	0.07	67	1.30	418	463	788	5,788

EXISTING CONDITIONS WITH WINDY GAP FIRMING

Demand (AF) 5000 Targeted Carryover (AF) 3950

			WSI VARIABLES										
	WATER SUPPLY INDEX (WSI)	VARIABLE REDUCTION (%)	SUPPLY (AF/yr)	SBC DIVERSIONS (AF)	C-BT based on QUOTA	1739 (AF)	WG based on QUOTA	900 (AF)	MARSHALL LAKE shares QUOTA	322.5 (AF)	CARRYOVER (last) (AF)	CARRYOVER (next) (AF)	TOTAL DEMAND (AF)
NORMAL	210%	0.00%	10,476	4,000	0.7	1,217	0.2	180	3.5	1,129	3,950	0	5000
STAGE 1	90%	42.50%	6,024	2,300	0.40	700	0.12	104	2.01	649	2,271	1,679	6,679
STAGE 2	80%	47.50%	5,500	2,100	0.37	639	0.11	95	1.84	593	2,074	1,876	6,876
STAGE 3	70%	52.50%	4,976	1,900	0.33	578	0.10	86	1.66	536	1,876	2,074	7,074
STAGE 4	50%	64.00%	3,771	1,440	0.25	438	0.07	65	1.26	406	1,422	2,528	7,528

$$WSI = \frac{\text{Supply}}{\text{Total Demand}} = \frac{\text{Carryover(last)} + \text{SBC Directs} + \text{C-BT} + \text{WG} + \text{Marshall Lake}}{\text{Demand} + \{\text{Targeted Carryover} - \text{Carryover(next)}\}}$$

WATER SUPPLY INDEX VARIABLE DETERMINATION WORKSHEET

VARIABLE REDUCTION REQUIRED TO PRODUCE A GIVEN WATER SUPPLY INDEX

FUTURE CONDITIONS

Demand (AF) 7120 Targeted Carryover (AF) 1250

			WSI VARIABLES										
	WATER SUPPLY INDEX (WSI)	VARIABLE REDUCTION (%)	SUPPLY (AF/yr)	SBC DIVERSIONS (AF)	C-BT based on QUOTA	2571 (AF)	WG based on QUOTA	900 (AF)	MARSHALL LAKE shares QUOTA	350 (AF)	CARRYOVER (last) (AF)	CARRYOVER (next) (AF)	TOTAL DEMAND (AF)
NORMAL	119%	0.00%	8,455	4,000	0.7	1,800	0.2	180	3.5	1,225	1,250	0	7120
STAGE 1	90%	21.00%	6,679	3,160	0.55	1,422	0.16	142	2.77	968	988	263	7,383
STAGE 2	80%	29.00%	6,003	2,840	0.50	1,278	0.14	128	2.49	870	888	363	7,483
STAGE 3	70%	37.00%	5,326	2,520	0.44	1,134	0.13	113	2.21	772	788	463	7,583
STAGE 4	50%	53.50%	3,931	1,860	0.33	837	0.09	84	1.63	570	581	669	7,789

FUTURE CONDITIONS WITH WINDY GAP FIRMING

Demand (AF) 7120 Targeted Carryover (AF) 3950

			WSI VARIABLES										
	WATER SUPPLY INDEX (WSI)	VARIABLE REDUCTION (%)	SUPPLY (AF/yr)	SBC DIVERSIONS (AF)	C-BT based on QUOTA	2571 (AF)	WG based on QUOTA	900 (AF)	MARSHALL LAKE shares QUOTA	350 (AF)	CARRYOVER (last) (AF)	CARRYOVER (next) (AF)	TOTAL DEMAND (AF)
NORMAL	157%	0.00%	11,155	4,000	0.7	1,800	0.2	180	3.5	1,225	3,950	0	7120
STAGE 1	90%	32.10%	7,574	2,716	0.48	1,222	0.14	122	2.38	832	2,682	1,268	8,388
STAGE 2	80%	38.00%	6,916	2,480	0.43	1,116	0.12	112	2.17	760	2,449	1,501	8,621
STAGE 3	70%	44.50%	6,191	2,220	0.39	999	0.11	100	1.94	680	2,192	1,758	8,878
STAGE 4	50%	57.50%	4,741	1,700	0.30	765	0.09	77	1.49	521	1,679	2,271	9,391

$$WSI = \frac{\text{Supply}}{\text{Total Demand}} = \frac{\text{Carryover(last)} + \text{SBC Directs} + \text{C-BT} + \text{WG} + \text{Marshall Lake}}{\text{Demand} + \{\text{Targeted Carryover} - \text{Carryover(next)}\}}$$

METER READING DATA

Provided by Utility Billing
All METER CYCLES

provisional not all data is in yet

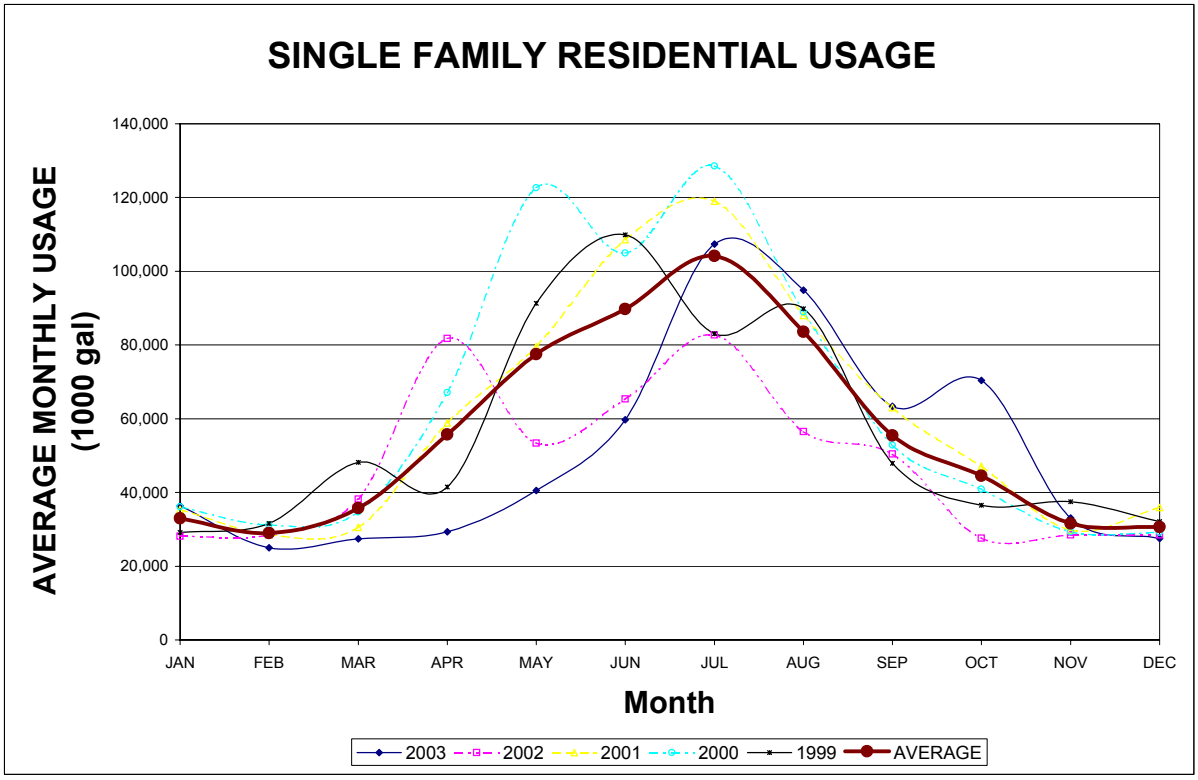
	MONTHLY TOTAL (gallons)				AVERAGE	
	2001	2002	2003	2004	AVE (gal)	AVE (AF)
Jan		53,079,426	47,147,775	23,349,257	41,192,153	126.4
Feb	50,172,394	53,567,369	44,313,599		49,351,121	151.5
Mar	60,243,500	50,861,786	47,422,286		52,842,524	162.2
Apr	46,907,343	47,335,164	51,642,214		48,628,240	149.2
May	71,174,550	90,141,407	88,374,772		83,230,243	255.4
Jun	132,034,679	118,962,929	133,756,337		128,251,315	393.6
Jul	165,139,200	89,444,207	173,055,034		142,546,147	437.5
Aug	192,940,268	113,394,678	159,561,135		155,298,694	476.6
Sep	197,095,207	102,223,283	118,397,432		139,238,640	427.3
Oct	130,711,011	84,811,046	90,322,540		101,948,199	312.9
Nov	88,673,826	68,352,036	49,023,571		68,683,144	210.8
Dec	58,446,943	47,941,697	47,468,493		51,285,711	157.4
Annual AF	3,663	2,824	3,224		1,062,496,131	3,261

				6538	TAPS	
	MONTHLY AVERAGE per TAP (gallons)				AVERAGE	
	2001	2002	2003	2004	AVERAGE	AVE (AF)
Jan		8,119	7,211	3,571	6,300	0.019
Feb	7,674	8,193	6,778		7,548	0.023
Mar	9,214	7,779	7,253		8,082	0.025
Apr	7,175	7,240	7,899		7,438	0.023
May	10,886	13,787	13,517		12,730	0.039
Jun	20,195	18,196	20,458		19,616	0.060
Jul	25,258	13,681	26,469		21,803	0.067
Aug	29,511	17,344	24,405		23,753	0.073
Sep	30,146	15,635	18,109		21,297	0.065
Oct	19,993	12,972	13,815		15,593	0.048
Nov	13,563	10,455	7,498		10,505	0.032
Dec	8,940	7,333	7,260		7,844	0.024
Annual AF per Tap	0.560	0.432	0.493		162,511	0.499

NOTE: 6538 taps as of July 31, 2003, according to Utility Billing.
Includes all types of taps.

SINGLE FAMILY RESIDENTIAL

Based on 1999-2003 Meter Billing Data



SINGLE FAMILY RESIDENTIAL

Based on 1999-2003 Meter Billing Data

IRES

Total monthly usage (1000gal)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL (1000gal)	ANNUAL (AF)
2003	36,376	25,021	27,418	29,305	40,526	59,676	107,368	94,842	63,358	70,406	33,095	27,550	614,941	1,887
2002	28,157	28,468	38,175	81,748	53,356	65,346	82,710	56,483	50,407	27,643	28,468	28,468	569,429	1,748
2001	35,371	28,520	30,522	58,814	79,606	108,607	119,023	87,980	62,995	47,160	29,740	35,961	724,299	2,223
2000	36,064	31,126	34,698	67,129	122,624	104,973	128,535	88,944	52,847	40,900	29,306	29,187	766,333	2,352
1999	29,148	31,617	48,161	41,496	91,268	109,918	83,051	89,811	47,916	36,523	37,526	32,114	678,549	2,083
AVERAGE	**33,023**	**28,950**	**35,795**	**55,698**	**77,476**	**89,704**	**104,137**	**83,612**	**55,505**	**44,526**	**31,627**	**30,656**		
											Average excluding 2002		696,031	2,136

Distribution over the year

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
2003	5.92%	4.07%	4.46%	4.77%	6.59%	9.70%	17.46%	15.42%	10.30%	11.45%	5.38%	4.48%	100%
2002	4.94%	5.00%	6.70%	14.36%	9.37%	11.48%	14.53%	9.92%	8.85%	4.85%	5.00%	5.00%	100%
2001	4.88%	3.94%	4.21%	8.12%	10.99%	14.99%	16.43%	12.15%	8.70%	6.51%	4.11%	4.96%	100%
2000	4.71%	4.06%	4.53%	8.76%	16.00%	13.70%	16.77%	11.61%	6.90%	5.34%	3.82%	3.81%	100%
1999	4.30%	4.66%	7.10%	6.12%	13.45%	16.20%	12.24%	13.24%	7.06%	5.38%	5.53%	4.73%	100%
Ave	**4.95%**	**4.18%**	**5.07%**	**6.94%**	**11.76%**	**13.65%**	**15.73%**	**13.10%**	**8.24%**	**7.17%**	**4.71%**	**4.50%**	100%
StDev	**0.30%**	**0.39%**	**1.58%**	**1.38%**	**2.51%**	**1.25%**	**2.52%**	**0.83%**	**1.00%**	**0.67%**	**0.91%**	**0.61%**	

AVERAGE MONTHLY USAGE per TAP (gallons) *Assuming 5869 Taps

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Ave monthly usage 1999-2003 (gal) [EXCLUDING 2002 DATA]	5,871	4,960	6,018	8,231	13,945	16,187	18,650	15,539	9,772	8,503	5,586	5,333

5,553 Winter Months (Nov-Mar)
12,975 Summer Months (Apr-Oct)
Ave. Yrly Use 118,594 (gal) Total/Tap
130 (gpcd) 2.5c/tap

WATER USE STATISTICS (%)

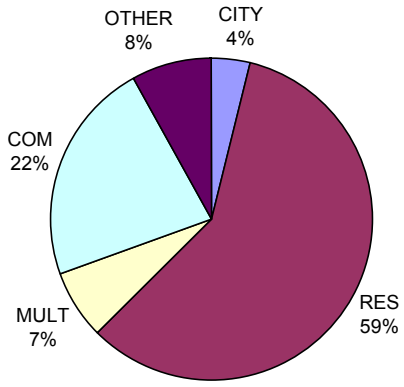
Total IRES Taps		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
5,867	2003	22%	7%	9%	0%	3%	8%	36%	26%	10%	13%	17%	8%
5,869	2002	9%	9%	25%	19%	4%	9%	19%	5%	3%	0%	9%	9%
5,869	2001	19%	9%	12%	7%	19%	37%	42%	23%	10%	3%	11%	21%
5,869	2000	21%	13%	19%	12%	45%	34%	47%	23%	5%	2%	10%	10%
5,869	1999	10%	14%	41%	2%	27%	37%	20%	25%	4%	1%	23%	15%

Percentage of taps exceeding 8k gallons per month during the winter (Nov-Mar)
Percentage of taps exceeding 20k gallons per month during the summer (Apr-Oct)

ANNUAL WATER USAGE BY CUSTOMER TYPE
BASED ON METER READING DATA

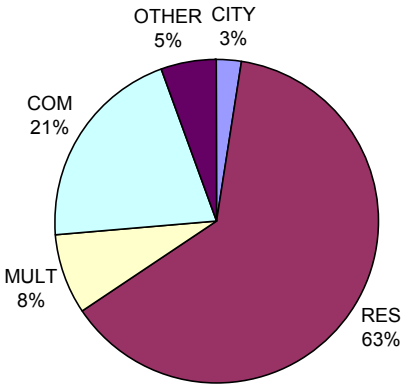
2003

ANNUAL USAGE = 1,052,829,000 (gals)



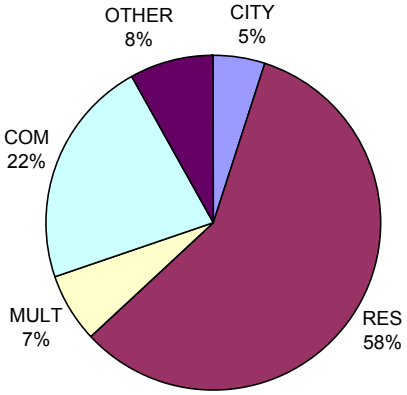
2002

ANNUAL USAGE = 906,198,000 (gals)



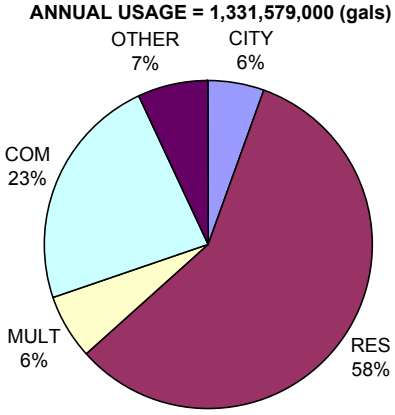
2001

ANNUAL USAGE = 1,257,185,000 (gals)



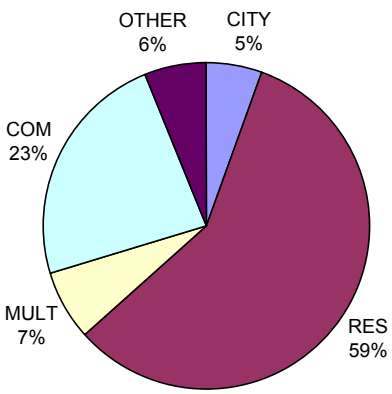
2000

ANNUAL USAGE = 1,331,579,000 (gals)



1999

ANNUAL USAGE = 1,175,136,000 (gals)



STATISTICAL METER READING INFORMATION FOR 2003 (1000 gals)

USER TYPE	STATISTIC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
CITY	Average	7.13	6.00	5.95	6.66	9.32	41.86	96.87	109.49	73.10	59.24	10.87	9.15	No. of Services
	stdev	40.27	35.74	31.72	35.26	33.13	62.69	124.37	155.18	99.57	84.63	37.34	40.56	93
	max	319.00	306.00	261.00	291.00	211.00	320.00	598.00	870.00	483.00	392.00	246.00	253.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40,514
	median	0.00	0.00	0.00	0.00	0.00	20.00	59.00	54.00	33.00	29.00	0.00	0.00	
RES	Average	6.20	4.26	4.68	4.99	6.90	10.16	18.29	16.17	10.83	12.03	5.67	4.73	No. of Services
	stdev	3.95	3.14	3.14	3.60	5.81	7.76	12.71	13.00	8.24	8.96	4.03	4.03	5,883
	max	44.00	65.00	51.00	66.00	103.00	139.00	195.00	487.00	102.00	272.00	61.00	200.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	617,346
	median	6.00	4.00	4.00	5.00	5.00	9.00	16.00	14.00	10.00	10.00	5.00	4.00	
MULTI	Average	38.91	25.15	30.51	30.07	36.36	36.18	57.01	57.75	49.38	51.83	34.28	29.14	No. of Services
	stdev	34.16	24.14	23.51	28.67	36.53	36.00	58.89	64.07	81.23	57.13	81.39	24.97	156
	max	157.00	107.00	94.00	126.00	187.00	235.00	429.00	374.00	590.00	412.00	1005.00	140.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	1.00	2.00	0.00	1.00	0.00	0.00	74,347
	median	28.00	17.00	25.00	20.00	22.50	25.00	36.50	34.50	23.00	37.50	21.00	21.00	
COM	Average	41.81	0.03	5.20	5.52	4.94	8.34	14.66	27.92	0.78	12.11	7.22	4.72	No. of Services
	stdev	115.88	0.42	2.91	2.93	2.73	8.46	9.18	16.05	3.29	7.55	4.48	3.57	309
	max	1320.00	7.00	19.00	18.00	16.00	118.00	57.00	94.00	25.00	43.00	29.00	49.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	235,320
	median	10.00	0.00	5.00	5.00	4.00	7.00	13.00	25.00	0.00	10.00	6.00	4.00	
OTHER	Average	0.86	0.09	0.50	2.06	42.64	124.17	234.30	227.58	178.99	142.41	14.13	1.63	No. of Services
	stdev	5.39	0.75	3.10	5.30	54.12	134.36	259.30	234.80	200.43	150.19	31.71	7.95	88
	max	44.00	7.00	26.00	31.00	209.00	573.00	1129.00	1086.00	947.00	756.00	145.00	59.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	85,302
	median	0.00	0.00	0.00	0.00	16.50	75.00	138.50	154.50	123.50	90.50	0.00	0.00	

STATISTICAL METER READING INFORMATION FOR 2002 (1000 gals)

USER TYPE	STATISTIC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
CITY	Average	9.64	9.15	9.09	42.46	28.74	32.75	45.27	36.00	17.81	7.14	9.15	9.15	No. of Services
	stdev	55.78	51.62	43.72	77.06	43.19	43.71	62.07	53.96	36.85	31.47	51.62	51.62	91
	max	378.00	396.00	302.00	381.00	268.00	299.00	369.00	274.00	265.00	228.00	396.00	396.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23,329
	median	0.00	0.00	0.00	8.00	15.00	18.00	24.00	18.00	4.00	0.00	0.00	0.00	
RES	Average	4.80	4.85	6.50	13.94	9.11	11.16	14.12	9.65	8.62	4.71	4.85	4.85	No. of Services
	stdev	3.27	3.09	4.36	9.54	5.82	7.31	9.33	6.18	5.73	2.95	3.09	3.09	5,887
	max	116.00	87.00	50.00	210.00	78.00	106.00	147.00	64.00	72.00	33.00	87.00	87.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	571,888
	median	4.00	4.00	6.00	12.00	8.00	10.00	13.00	9.00	8.00	4.00	4.00	4.00	
MULTI	Average	30.88	30.43	30.49	59.84	37.41	38.48	50.47	39.82	44.21	32.11	30.43	30.43	No. of Services
	stdev	27.40	23.97	24.67	68.37	30.30	33.10	46.09	36.19	40.69	29.39	23.97	23.97	157
	max	203.00	125.00	122.00	396.00	135.00	167.00	228.00	167.00	243.00	141.00	125.00	125.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	71,438
	median	24.00	26.00	24.00	37.00	27.00	30.00	34.00	26.00	31.00	24.00	26.00	26.00	
COM	Average	41.85	36.54	43.35	99.33	58.08	61.00	74.69	56.51	59.00	37.68	36.54	36.54	No. of Services
	stdev	148.09	92.02	102.31	166.31	123.94	128.63	143.42	111.73	125.61	97.13	92.02	92.02	297
	max	2080.00	1100.00	1250.00	1580.00	1530.00	1650.00	1820.00	1340.00	1560.00	1180.00	1100.00	1100.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	190,407
	median	10.00	10.00	14.00	44.00	22.00	24.00	30.00	25.00	26.00	11.00	10.00	10.00	
OTHER	Average	0.64	1.36	17.67	158.83	60.77	64.15	86.99	69.15	57.43	3.02	1.36	1.36	No. of Services
	stdev	3.04	6.03	41.35	201.20	140.82	146.25	190.75	165.03	170.71	9.11	6.03	6.03	94
	max	18.00	41.00	281.00	1027.00	1293.00	1330.00	1725.00	1486.00	1625.00	56.00	41.00	41.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	49,136
	median	0.00	0.00	0.00	83.00	25.50	28.00	44.00	32.00	24.50	0.00	0.00	0.00	

STATISTICAL METER READING INFORMATION FOR 2001 (1000 gals)

USER TYPE	STATISTIC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
CITY	Average	8.42	6.58	10.64	40.44	108.26	170.08	176.67	95.12	65.12	10.84	5.31	6.82	No. of Services
	stdev	46.59	36.14	40.30	95.07	155.44	252.23	233.22	115.71	100.03	43.62	32.22	39.56	91
	max	381.00	286.00	268.00	654.00	781.00	1481.00	1301.00	468.00	503.00	386.00	292.00	345.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	64,091
	median	0.00	0.00	0.00	5.00	41.00	92.00	93.00	57.00	26.00	0.00	0.00	0.00	
RES	Average	6.02	4.86	5.20	10.04	13.58	18.53	20.32	15.01	10.75	8.04	5.07	6.13	No. of Services
	stdev	3.72	2.88	3.27	7.51	9.65	12.32	14.24	10.30	7.83	5.68	3.11	3.93	5,887
	max	73.00	36.00	53.00	208.00	252.00	303.00	337.00	211.00	138.00	75.00	45.00	69.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	727,405
	median	6.00	4.00	5.00	9.00	12.00	17.00	18.00	14.00	9.00	7.00	5.00	6.00	
MULTI	Average	41.90	31.67	30.73	45.70	49.83	58.20	68.37	57.10	50.13	41.96	34.14	38.65	No. of Services
	stdev	45.45	25.88	24.14	43.27	60.24	78.10	86.92	73.34	52.11	34.64	30.48	31.14	157
	max	448.00	125.00	121.00	262.00	453.00	557.00	617.00	499.00	269.00	173.00	199.00	143.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	86,098
	median	31.00	24.00	24.00	34.00	31.00	37.00	45.00	33.00	34.00	34.00	28.00	31.00	
COM	Average	58.29	45.59	47.78	91.67	97.06	110.74	145.37	111.64	79.31	52.66	41.61	55.65	No. of Services
	stdev	245.44	161.38	166.88	278.90	250.41	209.08	257.05	196.33	145.19	134.04	123.74	214.16	297
	max	3710.00	2210.00	2270.00	3950.00	3220.00	1680.00	2150.00	1660.00	1650.00	1840.00	1430.00	3000.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	278,395
	median	13.00	10.00	11.00	28.00	31.00	39.00	54.00	46.00	33.00	18.00	10.00	11.00	
OTHER	Average	2.81	3.64	9.57	75.77	146.20	201.38	254.76	192.77	137.80	47.77	1.86	2.23	No. of Services
	stdev	12.21	24.24	26.77	109.65	206.19	262.83	330.91	231.99	185.54	91.96	15.70	9.07	94
	max	96.00	225.00	193.00	477.00	1392.00	1481.00	2033.00	1121.00	1232.00	471.00	152.00	50.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	101,196
	median	0.00	0.00	0.00	27.00	85.50	106.50	132.00	126.00	68.00	3.50	0.00	0.00	

STATISTICAL METER READING INFORMATION FOR 2000 (1000 gals.)

USER TYPE	STATISTIC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
CITY	Average	7.49	15.10	27.76	74.41	169.43	151.38	175.99	126.54	46.16	9.66	6.07	7.36	No. of Services
	stdev	41.94	54.20	86.54	138.82	291.94	225.86	240.01	189.01	122.95	41.51	32.86	37.71	91
	max	354.00	310.00	588.00	864.00	2033.00	1607.00	1484.00	1240.00	1049.00	309.00	270.00	301.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	74,379
	median	0.00	0.00	0.00	23.00	55.00	64.00	78.00	51.00	4.00	0.00	0.00	0.00	
RES	Average	6.14	5.30	5.91	11.44	20.92	17.91	21.94	15.18	9.02	6.97	4.99	4.98	No. of Services
	stdev	3.61	3.26	4.07	8.27	14.22	12.69	15.52	10.57	6.72	4.78	3.54	3.37	5,887
	max	37.00	39.00	45.00	112.00	407.00	401.00	332.00	206.00	98.00	87.00	116.00	50.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	769,370
	median	6.00	5.00	5.00	10.00	19.00	16.00	20.00	13.00	8.00	6.00	5.00	4.00	
MULTI	Average	35.18	27.52	28.32	37.05	67.24	58.24	77.10	62.68	44.66	40.90	33.64	32.39	No. of Services
	stdev	31.07	23.58	24.51	36.83	78.80	75.49	103.25	83.18	45.16	35.16	29.23	37.52	157
	max	136.00	103.00	119.00	247.00	581.00	605.00	777.00	612.00	282.00	158.00	135.00	387.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	85,552
	median	26.00	20.00	19.00	26.00	46.00	37.00	48.00	38.00	32.00	29.00	24.00	23.00	
COM	Average	55.71	45.75	52.91	91.44	142.67	136.59	155.10	117.91	81.52	65.87	42.86	53.95	No. of Services
	stdev	277.42	219.17	243.25	315.56	506.61	606.37	392.06	370.67	249.82	213.29	125.30	274.88	297
	max	4450.00	3310.00	3710.00	4700.00	7820.00	9990.00	5130.00	5600.00	3620.00	2930.00	1220.00	4410.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	309,552
	median	8.00	7.00	9.00	22.00	40.00	35.00	53.00	38.00	29.00	16.00	10.00	10.00	
OTHER	Average	4.00	5.68	18.17	96.17	179.56	183.20	243.32	158.13	73.71	21.91	0.85	1.73	No. of Services
	stdev	20.40	19.23	48.55	145.55	254.80	248.04	333.91	224.88	94.98	52.23	4.68	7.62	94
	max	164.00	107.00	383.00	839.00	1179.00	1226.00	1679.00	1177.00	376.00	239.00	34.00	47.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	92,726
	median	0.00	0.00	0.00	36.50	85.50	90.00	118.50	82.00	39.00	0.00	0.00	0.00	

STATISTICAL METER READING INFORMATION FOR 1999 (1000 gals)

USER TYPE	STATISTIC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
CITY	Average	5.25	9.01	27.11	24.59	132.37	158.51	125.01	142.44	38.84	9.23	23.14	12.62	No. of Services
	stdev	29.83	42.31	75.18	55.80	271.13	290.36	209.82	223.29	91.52	33.59	181.71	67.45	91
	max	266.00	293.00	366.00	350.00	1951.00	1862.00	1127.00	1093.00	616.00	217.00	1729.00	568.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	64,439
	median	0.00	0.00	0.00	1.00	32.00	39.00	36.00	44.00	4.00	0.00	0.00	0.00	
RES	Average	4.96	5.38	8.20	7.07	15.55	18.74	14.18	15.32	8.17	6.22	6.39	5.47	No. of Services
	stdev	3.21	3.54	5.37	5.31	10.94	12.98	9.99	11.28	5.95	4.27	4.19	3.51	5,887
	max	57.00	58.00	52.00	169.00	238.00	326.00	240.00	311.00	69.00	50.00	83.00	37.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	680,876
	median	5.00	5.00	7.00	6.00	14.00	17.00	13.00	13.00	7.00	5.00	6.00	5.00	
MULTI	Average	29.57	29.44	36.71	35.15	55.08	66.96	56.08	69.46	47.58	31.52	34.63	30.43	No. of Services
	stdev	26.15	25.68	31.91	33.00	63.82	125.40	83.54	103.25	73.99	31.33	30.52	27.04	157
	max	129.00	122.00	150.00	156.00	406.00	987.00	542.00	831.00	627.00	152.00	142.00	123.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	82,050
	median	24.00	23.00	30.00	23.00	38.00	39.00	34.00	41.00	30.00	21.00	24.00	21.00	
COM	Average	38.65	55.60	74.55	72.53	107.43	114.72	118.65	120.60	68.79	54.30	52.93	47.75	No. of Services
	stdev	144.85	376.18	389.19	385.08	408.70	486.87	472.22	455.09	244.00	265.66	231.36	218.57	297
	max	1980.00	6332.00	6332.00	6333.00	6333.00	7830.00	7320.00	7230.00	3720.00	4260.00	3480.00	3360.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	275,171
	median	5.00	6.00	12.00	12.00	22.00	24.00	25.00	31.00	18.00	10.00	9.00	7.00	
OTHER	Average	0.54	3.99	27.28	40.14	116.11	162.86	158.36	183.09	58.04	17.07	3.60	1.88	No. of Services
	stdev	3.50	13.99	60.08	96.45	159.32	225.14	231.69	261.74	85.37	47.66	17.83	8.02	94
	max	33.00	92.00	299.00	763.00	667.00	1112.00	1147.00	1293.00	372.00	299.00	121.00	57.00	Annual Usage (1000gal)
	min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	72,600
	median	0.00	0.00	0.00	0.50	46.00	59.50	57.50	75.50	11.00	0.00	0.00	0.00	